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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED  
OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371**516 Rec'd PCT/PTO 23 JUL 1999**

ATTORNEY'S DOCKET NUMBER		
CASM114222		
U.S. APPLICATION NO. (if known see 37 C.F.R. 1.5)		
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/AU98/00046	29 January 1998	29 January 1997
TITLE OF INVENTION		
PRINTED MATTER PRODUCING REFLECTIVE INTAGLIO EFFECT.		
APPLICANT(S) FOR DO/EO/US		
Ronald Gibson GRATION; Ana GHIOGHIU; Cameron Rex HIBBERT; and Paul ZIENTEK		

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information by Express Mail:

- X   1. This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 37 U.S.C. 371.
- X   3. This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
- X   4. A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
- X   5. A copy of the International Application as filed (35 U.S.C. 371(c)(2))
- a. is transmitted herewith (required only if not transmitted by the International Bureau).
- X   b. has been transmitted by the International Bureau.
- c. is not required, as the application was filed in the United States Receiving Office (RO/US).

LAW OFFICES OF  
CHRISTENSEN O'CONNOR  
JOHNSON & KINDNESS<sup>PLLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
(206) 682-8100

- \_\_\_\_\_ 6. A translation of the International Application into English (35 U.S.C. 371(c)(2)).
- X 7. Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
- \_\_\_\_\_ X a. are transmitted herewith (required only if not transmitted by the International Bureau).
- \_\_\_\_\_ b. have been transmitted by the International Bureau.
- \_\_\_\_\_ c. have not been made; however, the time limit for making such amendments has NOT expired.
- \_\_\_\_\_ d. have not been made and will not be made.
- \_\_\_\_\_ 8. A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
- \_\_\_\_\_ 9. An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
- \_\_\_\_\_ 10. A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Items 11. to 16. below concern document(s) or information included:**

- \_\_\_\_\_ 11. An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98.
- \_\_\_\_\_ 12. An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included..
- X 13a. A FIRST preliminary amendment.
- \_\_\_\_\_ 13b. A SECOND or SUBSEQUENT preliminary amendment.
- \_\_\_\_\_ 14. A substitute specification.
- \_\_\_\_\_ 15. A change of power of attorney and/or address letter.
- X 16. Other items or information:
- \_\_\_\_\_ X a. Photocopy of International Preliminary Examination Report, including annexes.

<u>X</u> 17. The following fees are submitted:				<b>CALCULATIONS</b> <small>PTO USE ONLY</small>	
<b>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5):</b>					
Search Report has been prepared by the EPO or JPO ..... \$840					
International preliminary examination fee paid to USPTO (37 CFR 1.482) .... \$670					
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) ..... \$760					
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$970					
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) ..... \$96					
<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				\$970	
Surcharge of \$130 for furnishing the oath or declaration later than ____ 20 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ --	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	20 - 20 =	Ø	X \$18	\$ --	
Independent claims	2 - 3 =	Ø	X \$78	\$ --	
MULTIPLE DEPENDENT CLAIMS(S) (if applicable)			+ \$260	\$260	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				\$1230	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				\$ --	
<b>SUBTOTAL =</b>				\$1230	
Processing fee of \$130 for furnishing the English translation later than ____ 20 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$ --	
<b>TOTAL NATIONAL FEE =</b>				\$1230	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40 per property				\$ --	
<b>TOTAL FEES ENCLOSED =</b>				\$1230	
				Amount to be: refunded	\$
				charged	\$

X 17a. A check in the amount of \$1230 to cover the above fees is enclosed.  
 Check No. 107607

LAW OFFICES OF  
 CHRISTENSEN O'CONNOR  
 JOHNSON & KINDNESS<sup>PLLC</sup>  
 1420 Fifth Avenue  
 Suite 2800  
 Seattle, Washington 98101  
 (206) 682-8100

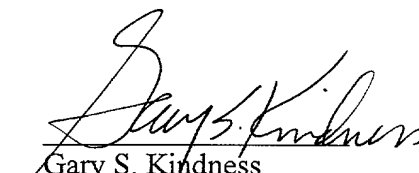
- \_\_\_\_\_ 17b. Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \$ \_\_\_\_\_ to cover the above fees. A duplicate copy of this sheet is enclosed.
- X 17c. The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 03-1740. A duplicate copy of this sheet is enclosed.

SEND ALL CORRESPONDENCE TO:

Gary S. Kindness  
CHRISTENSEN O'CONNOR JOHNSON & KINDNESS<sup>PLLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, WA 98101-2347

Respectfully submitted,

CHRISTENSEN O'CONNOR  
JOHNSON & KINDNESS<sup>PLLC</sup>

  
Gary S. Kindness  
Registration No. 22,178  
Direct Dial (206) 695-1702

**EXPRESS MAIL CERTIFICATE**

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Date of Deposit July 23, 1999

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. § 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Jeff Helgeson  
(Typed or printed name of person mailing paper or fee)

Jeff Helgeson  
(Signature of person mailing paper or fee)

GSK/PAS:jst/bjb

LAW OFFICES OF  
CHRISTENSEN O'CONNOR  
JOHNSON & KINDNESS<sup>PLLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
(206) 682-8100

514 Rec'd PCT/PTO 23 JUL 1999

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Ronald G. Gration; Ana Ghioghiu; Attorney Docket No. CASM114222  
Cameron R. Hibbert; and Paul Zientek

Int'l Application No: PCT/AU98/00046 Int'l Filing Date: 29 January 1998

U.S. Application Serial No: -- Priority Date Claimed: 29 January 1997

Filed: Concurrently Herewith Examiner: --

Title: PRINTED MATTER PRODUCING REFLECTIVE INTAGLIO EFFECT

PRELIMINARY AMENDMENT

TO THE ASSISTANT COMMISSIONER FOR PATENTS:

Please enter the following Preliminary Amendment for the above-identified patent application, which is the contemporaneously filed United States national application corresponding to International application No. PCT/AU98/00046, as follows:

In the Specification:

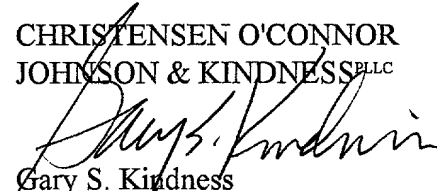
Amend the specification by inserting the following after the title: --This is a United States national stage application of International application No. PCT/AU98/00046, filed January 29, 1998, the benefit of the filing date of which is hereby claimed under 35 U.S.C. § 120, which in turn claims the benefit of Australian Application No. PO 4847, filed January 29, 1997, the benefit of the filing date of which is hereby claimed under 35 U.S.C. § 119.--.

REMARKS

If there are any questions, the Examiner is invited to telephone applicants' attorney at the number listed below.

Respectfully submitted,

CHRISTENSEN O'CONNOR  
JOHNSON & KINDNESS<sup>PLLC</sup>

  
Gary S. Kindness  
Registration No. 22,178  
Direct Dial (206) 695-1702

GSK/PAS/jst

CASM/14222PC1.DOC

CHRISTENSEN  
O'CONNOR  
JOHNSON  
KINDNESS<sup>PLLC</sup>

LAW OFFICES

1420 FIFTH AVENUE  
SUITE 2800  
SEATTLE, WASHINGTON 98101 2347  
TELEPHONE (206) 682 8100

PRINTED MATTER PRODUCING  
REFLECTIVE INTAGLIO EFFECT

Field of the Invention

This invention relates to printed matter, including banknotes, security  
5 documents and devices, and all other printed matter.

Background of the Invention

The printing industry is constantly looking for printing techniques which  
produce printed matter which offers additional security or which is visually appealing  
in various applications.

10 In the security printing industry, printed matter which exhibits an effect  
when visually inspected under various light conditions, but which is not capable of  
replication using known duplicating methods, such as photocopying or scanning, is  
highly advantageous.

A security document having some of these features is disclosed in U.S.  
15 Patent No. 4,420,515 - Amon et al, which includes a metallic film which is printed  
or embossed to produce a latent image which is viewed to verify the authenticity  
of the document. However, the process by which this document is produced  
requires a number of complex steps to apply the metallic film to the substrate  
before printing and embossing, and since it would be impractical to incorporate  
20 these application steps in the usual document printing process, difficulties will be  
experienced in making the process commercially attractive. Furthermore, the image  
produced by the printing and embossing of the metallic film is a latent image which  
may require specific conditions for viewing and verification.

The introduction of banknotes printed on polymer substrates has introduced  
25 a further dimension to the security printing industry, and the present invention seeks  
to provide a further improvement in banknotes and other security devices exhibiting  
the abovementioned desirable effect.

Summary of the Invention

The invention provides a printed document or other device comprising a  
30 substrate having a surface to which printed matter is applied, a reflective or brightly  
coloured layer applied directly to said surface as part of a printing process without

embossing the layer, and a raised printed image applied to said reflective or brightly coloured layer by a printing process, at least part of said raised printed image having a height of at least  $5\mu\text{m}$  and being visible from all angles of the document, said raised printed image being enhanced by said reflective or brightly coloured layer when  
5 viewed at different angles and under different lighting conditions.

By applying a raised printed image on a reflective or brightly coloured layer, the colour of the printed image is intensified and becomes brighter and is thus enhanced, and an optically variable image is produced when the document is viewed under different lighting conditions or at different viewing angles thereby introducing  
10 an optically variable effect of benefit in security applications. Since the reflective or brightly coloured layer is printed on said substrate, or is applied as part of a printing process, it is conveniently incorporated into the printing process to overcome the production shortcomings of the process described in U.S. Patent No. 4,420,515. Furthermore, the effect of the reflective or brightly coloured layer is to enhance the  
15 visible image produced by the raised printed regions, rather than to produce a latent image as in the U.S. Patent. The enhanced image is able to be directly viewed and does not require special lighting or other conditions.

The raised printed image is most conveniently produced by an intaglio printing process, although acceptable raised images may be produced by other  
20 known printing processes or by a combination of embossing and printing on raised embossed surfaces.

The enhanced image effect referred to above is not achieved if the image is printed using the normal offset printing process, and unless the height of the raised print is at least  $5\mu\text{m}$ , the enhancement produced by the underlying reflective or  
25 brightly coloured layer may be insufficient.

In one form of the invention, the substrate is a polymer film and preferably a laminated film of the type used in the production of Australian banknotes. Alternatively, the substrate can be a paper substrate provided it has a smooth surface on which the reflective or brightly coloured layer is applied.

30 In certain applications or areas of the document, the reflective or brightly coloured layer can be applied directly to the substrate or film, which can have its

own reflective effect, thereby intensifying the reflective properties of the reflective or brightly coloured layer. In other applications, an opaque ink layer may be first applied to the surface of the substrate and the reflective or brightly coloured layer applied to the opaque layer.

5 Both the reflective or brightly coloured layer and the opaque layer are preferably applied to the substrate by the Gravure printing process, although the reflective or brightly coloured layer may comprise a metallised foil or a brightly coloured foil which is laminated or adhesively applied to the surface of the substrate as part of the printing process.

10 The invention also provides a method of producing a printed document or other device on a substrate, comprising the step of applying a reflective or brightly coloured layer directly to the substrate as part of a printing process, followed by the step of applying a raised image to the reflective or brightly coloured layer by a printing process so that at least part of said raised image has a height of at least  $5\mu$  and is visible from all angles of the document.

15 In one form of the invention, the reflective or brightly coloured layer is an ink layer applied by the Gravure printing process and the raised print is produced by an intaglio printing process. Alternatively, the reflective or brightly coloured layer comprises a reflective or brightly coloured foil which is laminated or adhesively applied to the surface of the substrate as part of the printing process.

20 In a particularly preferred form of the invention, the reflective or brightly coloured layer is applied to an opaque layer which has been applied to the substrate.

#### Description of Preferred Embodiment

25 In a presently preferred form of the invention, a thin polymer substrate comprising laminated polypropylene sheets of the type currently used to produce Australian polymer banknotes firstly has an opaque layer applied to both sides of the substrate by the Gravure printing process, following which a reflective or brightly coloured layer of ink is applied also by the Gravure process.

30 The ink can comprise any suitable ink which produces a reflective or brightly coloured effect. Suitable inks include the following pigments blended at a 30% to 70% w/w concentration in clear varnish suitable for Gravure application.

Product Name: Bronze Powder Resist Rotoflex Brilliant Rich Pale Gold



Product Description: Flake oxidation resistant metal powder based on a copper-zinc-alloy. (ca 85% Cu, 15% Zn)

Particle Size: <45  $\mu\text{m}$

Product Manufacturer: ECKART-WERKE GmbH & Co

5 **and**

Product Name: Aluminium Powder Super Lining GGT

Product Description: Aluminium Powder (Aluminium based on H-A1 99,5%)

Manufacturer as above.

10 Printed matter is then applied to the surface of the reflective or brightly coloured layer by the intaglio process to produce a print having raised regions having a height of at least 5 $\mu\text{m}$ . The maximum height of the raised region will be determined by the intaglio or other printing/embossing process, but enhanced effects have been observed with raised regions of about 50 $\mu\text{m}$  in height. In the present example, the intaglio print can comprise the same prints which are currently applied  
15 to Australian polymer banknotes, and these prints are significantly enhanced by the reflective or brightly coloured background and an optically variable image is produced when the intaglio print is viewed under different lighting conditions and viewing angles.

Most printed images will have regions in which substantially parallel lines  
20 of raised ink are present. When these lines are viewed at an angle other than directly above the lines, significant enhancement of the image is produced by the reflective or brightly coloured layer. Of course, even if there are no parallel lines, some enhancement of the image is still produced by the underlying reflective or brightly coloured layer.

25 The reflective effect of the reflective or brightly coloured layer complements the image applied by the intaglio process since the intaglio process transfers a raised print to the substrate, and when such a print is applied to the reflective surface, a novel effect is achieved. An image can be observed by viewing the intaglio image at different angles. If the same intaglio image is printed on a non-  
30 reflective substrate, the same effect will not be achieved. The novel image effect may be explained by the following factors:

- When the raised intaglio print is viewed at a specific angle the walls of the intaglio lines hide the background print. The reflective or brightly coloured nature of the substrate intensifies the distinction between the intaglio and reflective substrate revealing and enhancing the raised image.

- 5 • The flat/smooth nature of polymer substrate enhanced by a reflective or brightly coloured printed surface, in addition to the raised surface of the intaglio image intensifies both of these properties.

As mentioned above, the reflective or brightly coloured ink can be applied directly to the surface of the polymer substrate since the substrate has its own reflective effect, and this intensifies the reflective effect produced by the reflective or brightly coloured ink layer. If the reflective or brightly coloured ink is applied without an opaque layer, the image will still provide a beneficial effect. Alternatively, if the reflective or brightly coloured ink layer is applied in a region which has been printed on the other side, the printed image will still be enhanced by the underlying reflective layer.

10

15

As mentioned above, the reflective ink layer can be replaced by a reflective foil or other film which is laminated or adhesively applied to the substrate and a similar effect is achieved in either case. Suitable reflective foils include those that are applied onto the substrate by hot stamping techniques. These foils typically comprise of a carrier film, a release layer, a metallised layer and an adhesive. Application of the foils is achieved by the hot stamping technique where the foil is adhered onto the substrate at a temperature of, but not limited to, 130°C and high compressive pressure, so that the adhesive is activated and the carrier film is released.

20

25 By applying an intaglio print to a reflective or brightly coloured substrate, the security features of the intaglio image are substantially enhanced, resulting in greater distinction of a security image. Both the optically variable intaglio effect and the reflective/glossy nature of the substrate are difficult to replicate by standard duplicating methods, such as colour photocopying or scanning, and the effect produced is aesthetically pleasing.

30

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CLAIMS:

1. A printed document or other device comprising a substrate having a surface to which printed matter is applied, a reflective or brightly coloured layer applied directly to said surface as part of a printing process without embossing the layer, and a raised printed image applied to said reflective or brightly coloured layer by a printing process, at least part of said raised printed image having a height of at least  $5\mu\text{m}$  and being visible from all angles of the document, said raised printed image being enhanced by said reflective or brightly coloured layer when viewed at different angles and under different lighting conditions.
2. The document of claim 1, wherein the raised image is produced by an intaglio printing process.
3. The document of claim 1 or 2, wherein the substrate is a plastics film capable of use to form a banknote, said reflective or brightly coloured layer being printed directly on the substrate to utilize any reflective effect in the film to intensify the reflective properties of the reflective or brightly coloured layer.
4. The document of claim 1 or 2, wherein the substrate is a plastics film capable of use to form a banknote, said reflective or brightly coloured layer being printed over an opaque ink layer applied to the surface of the substrate.
5. The document of claim 1 or 2, wherein the substrate is a paper film having a smooth surface to which said reflective or brightly coloured layer is applied.
6. The document of claim 2 or 5, wherein the reflective or brightly coloured layer is applied by a Gravure printing process.
7. The document of claim 3, wherein the reflective or brightly coloured layer and the opaque layer are applied to the substrate by a Gravure printing process.
8. A method of producing a printed document or other device on a substrate, comprising the step of applying a reflective or brightly coloured layer directly to the substrate as part of a printing process, followed by the step of

applying a raised image to the reflective or brightly coloured layer by a printing process so that at least part of said raised image has a height of at least  $5\mu$  and is visible from all angles of the document.

5 9. The method of claim 8, wherein the raised image is produced by an intaglio printing process.

10. The method of claim 8 or 9, wherein the substrate is a plastics film capable of use to form a banknote and having a surface reflective effect which intensifies the reflective properties of the reflective or brightly coloured layer.

10 11. The method of claim 8, wherein the substrate is a plastics film capable of use to form a banknote, further including the step of printing an opaque layer on the substrate, on which the reflective or brightly coloured layer is printed.

12. The method of claim 8 or 9, wherein the substrate is paper having a smooth surface to which the reflective or brightly coloured layer is applied.

15 13. The method of claim 10 or 12, wherein the reflective or brightly coloured layer is applied by a Gravure printing process.

14. The method of claim 11, wherein the opaque layer and the reflective or brightly coloured layer are applied by a Gravure printing process.

**COMBINED DECLARATION AND POWER OF ATTORNEY  
IN PATENT APPLICATION**

Attorney Docket No: CASM-1-14222

As a below-named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name;

I believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter that is claimed and for which patent is sought on the invention entitled: PRINTED MATTER PRODUCING REFLECTIVE INTAGLIO EFFECT, the specification of which (check only one item below):

\_\_\_\_\_ is attached hereto.

X we hereby authorize our attorneys of the firm of Christensen, O'Connor, Johnson & Kindness, 1420 Fifth Avenue, Suite 2800, Seattle, Washington 98101, to insert here in parentheses (was filed as United States application Serial No. 09/355,169 on \_\_\_\_\_ and was amended on July 23, 1999 (if applicable)) the application number and filing date of said application.

\_\_\_\_\_ was filed as United States application Serial No. \_\_\_\_\_ on \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

\_\_\_\_\_ was filed as international application No. PCT \_\_\_\_\_ on \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):

<u>Numbers</u>	<u>Country</u>	<u>Day/Month/Year Filed</u>	<u>Priority Claimed Yes/No</u>
PO 4847	Australia	29 January 1997	Yes

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

<u>Application No.</u>	<u>Filing Date</u>
------------------------	--------------------

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or Section 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

<u>U.S. Parent Application No.</u>	<u>PCT Parent No.</u>	<u>Parent Filing Date</u>	<u>Status (patented, pending, abandoned)</u>
--	-----------------------	---------------------------	--

I hereby appoint the following attorneys and/or agents to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith: Bruce E. O'Connor, Reg. No. 24,849; Lee E. Johnson, Reg. No. 22,946; Gary S. Kindness, Reg. No. 22,178; James W. Anable, Reg. No. 26,827; James R. Uhler, Reg. No. 25,096; Jerald E. Nagae, Reg. No. 29,418; Dennis K. Shelton, Reg. No. 26,997; Jeffrey M. Sakoi, Reg. No. 32,059; Ward Brown, Reg. No. 28,400; Robert J. Carlson, Reg. No. 35,472; Marcia S. Kelbon, Reg. No. 34,358; Rodney C. Tullett, Reg. No. 34,034; Daiva K. Tautvydas, Reg. No. 36,077; and the firm of Christensen O'Connor Johnson & Kindness<sup>PLLC</sup>. Direct all telephone calls to Gary S. Kindness at telephone No. (206) 682-8100. Address all correspondence to:

CHRISTENSEN O'CONNOR JOHNSON & KINDNESS<sup>PLLC</sup>

1420 Fifth Avenue  
Suite 2800  
Seattle, WA 98101-2347

I hereby further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-00  
Ronald Gibson GRATION Australian  
Full Name of Inventor Citizenship  
East Doncaster, VICTORIA 3109, AUSTRALIA  
Residence  
25 Devlaw Drive AUX  
Post Office Address

Inventor's Signature [Signature] Date 28/7/99

2-00  
Ana GHIOGHU Australian  
Full Name of Inventor Citizenship  
Elsternwick, VICTORIA 3185, AUSTRALIA  
Residence  
38 Hopetoun Street AUX  
Post Office Address

Inventor's Signature [Signature] Date 27. 7. 99

3-00  
Cameron Rex HIBBERT Australian  
Full Name of Inventor Citizenship  
Churchill, VICTORIA 3842, AUSTRALIA  
Residence  
15 Mulcare Crescent AUX  
Post Office Address

Inventor's Signature [Signature] Date 28/7/99

4-00  
Paul ZIENTEK Australian  
Full Name of Inventor Citizenship  
North Carlton, VICTORIA 3054, AUSTRALIA  
Residence  
546 Station Street AUX  
Post Office Address

Inventor's Signature [Signature] Date 27/7/99